

# AERSCREEN WORKGROUP PROGRESS REPORT

May 16, 2005

- **WORKGROUP GOAL:** Develop an AERMOD screening procedure (AERSCREEN) that will provide concentrations as conservative as predicted by AERMOD in refined mode and allow quick run time.
- **CURRENT PROGRESS:** AERSCREEN v1.5f (Beta) has been developed and is currently being tested. This version contains all desired elements (i.e. including wake, terrain and averaging period ratios). Extensive testing against AERMOD continues.

# AERSCREEN FINALIZATION WORKGROUP

- Roger Brode
- Herman Wong
- Warren Peters
- Karen Wesson
- Bob Paine
- Jim Haywood; and
- Anna Maria Coulter

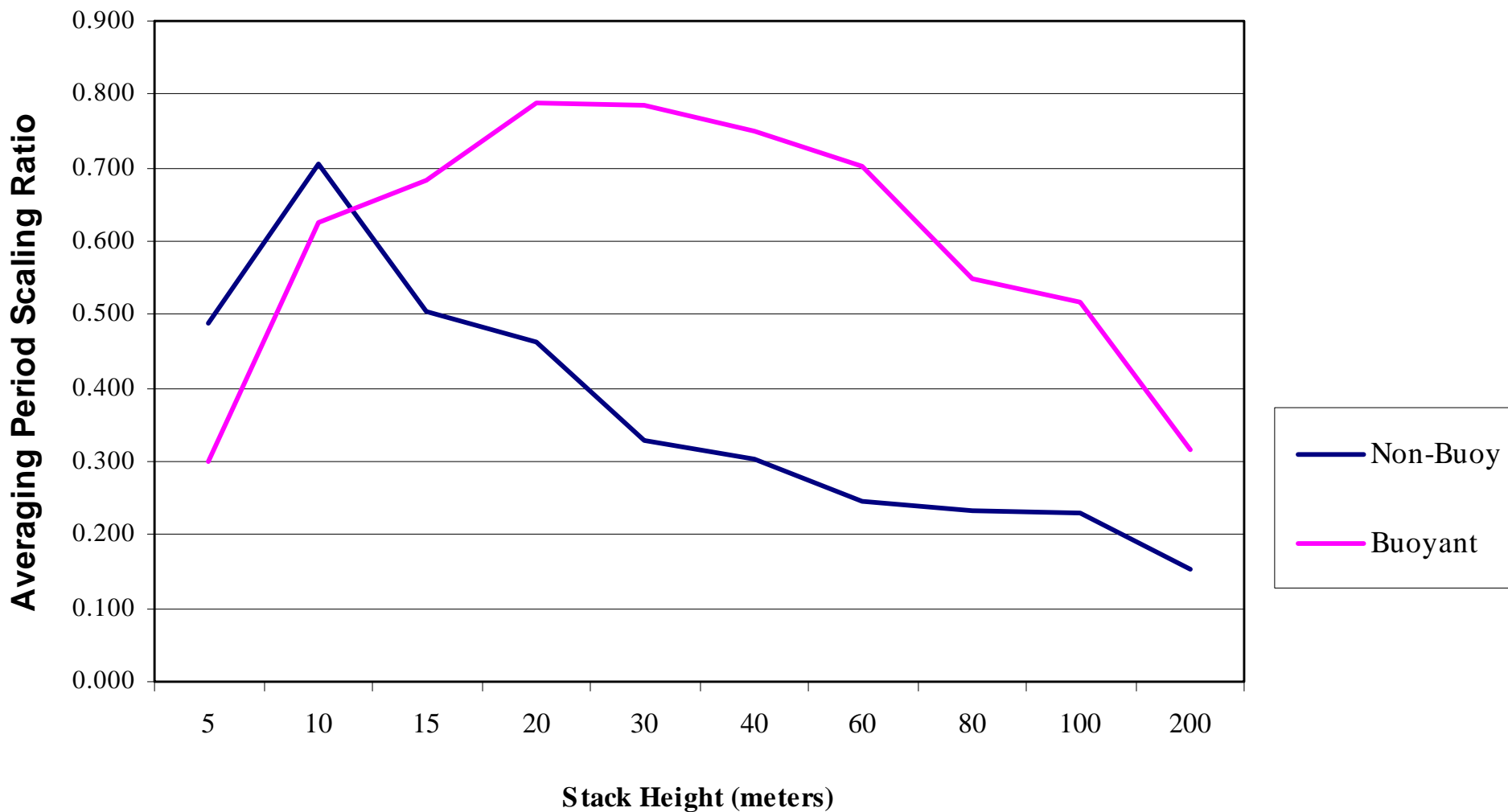
# AERSCREEN

## BETA VERSION CURRENT CAPABILITY

- Interactive data entry (DOS Screen);
- Flat and Complex terrain (DEM 1-degree files);
- PRIME building downwash (specific stack location);
- MAKEMET meteorology with site specific surface profiling;
- Re-Use of Previous AERSCREEN Run Files; and
- Stand-alone version of MAKEMET for “refined” screen runs.

# AERSCREEN SCALABLE RATIOS

24-Hour Averaging Period





AERSCREEN v1.5e - beta version

----- INITIAL INFORMATION -----

Enter Title: AERSCREEN Test Run

English or Metric Units? (E or M): E

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----- STACK INFORMATION -----

Enter Emission Rate (lb/hr): 1

Enter Stack Height (feet): 50

Enter Stack Diameter (inches): 24

Enter Stack Temperature (F): 190

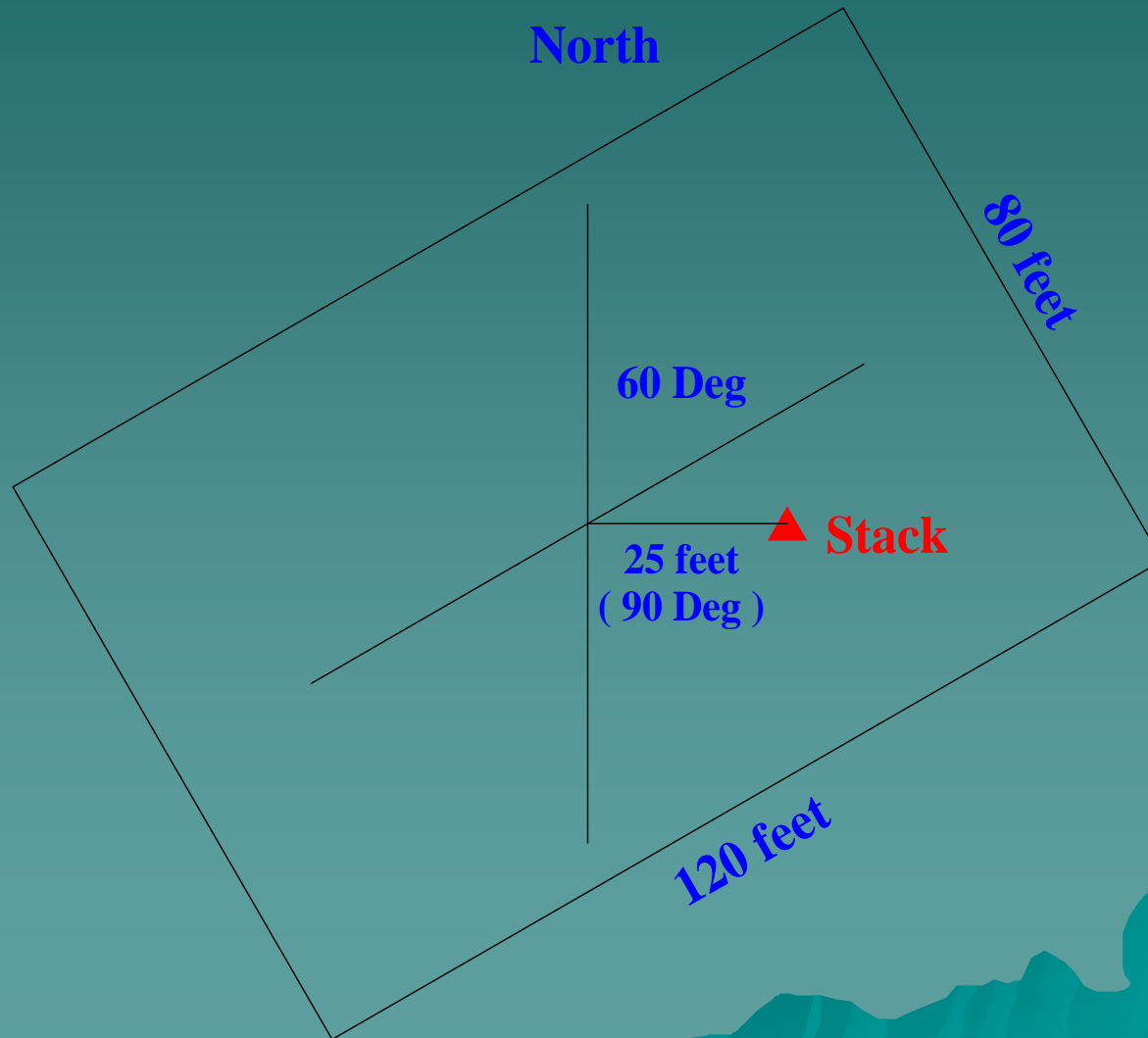
- 
- Option (1) - Exit Velocity (m/s)
  - Option (2) - Exit Velocity (ft/s)
  - Option (3) - Flow Rate (ACFM)
- 

Enter Option for Flow Rate or Exit Velocity: 3

Enter Flow Rate (ACFM): 3000

Rural or Urban? (R or U): r

# AERSCREEN PROGRAM RUN – BUILDING DATA



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----- BUILDING DOWNWASH INFORMATION -----

Enter Building Height (feet): 30

Enter Building Length (feet): 120

Enter Building Width (feet): 80

Enter Building Lengthwise Angle to True North (0 - 360 degees): 60

Enter Direction of Stack from Building Center (0 - 360 degrees): 90

Enter Distance Between Stack and Building Center (feet): 25



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----- MAKEMET METEOROLOGY -----

Enter Min & Max Ambient Temperatures or <cr> to default to -10 100 Deg F...

**\*\*Note:** Enter both temperatures on same line separated by a space:

Enter Minimum Wind Speed or <cr> to default to 0.5 m/s...

Enter Anemometer Height or <cr> to default to 10.0 meters...

Enter U>ser or D>efault Surface Characteristics (U or D): d

- 1) Water
- 2) Deciduous Forest
- 3) Coniferous Forest
- 4) Swamp
- 5) Cultivated Land
- 6) Grassland
- 7) Urban
- 8) Desert Shrubland

Enter Dominant Surface Profile: 5

- 1) Average Moisture
- 2) Wet Conditions
- 3) Dry Conditions

Enter Dominant Climate Profile: 1



The following 1-Degree Digital Elevation Map (DEM) file(s) are missing and are required to complete this analysis using terrain features:

MISSING: grand\_rapids-e.gz

Please select one of the following options to continue...

NOTE!?: This computer must be able to connect to an internet browser to use Options (1) or (2)

- 
- Option (1) - Automatic Internet Download via FTP
  - Option (2) - Manual Internet Download with Assistance
  - Option (3) - Continue Analysis in Flat Terrain Mode
  - Option (4) - Abort AERSCREEN Run
- 

Enter Option:

If FTP fails to access the internet, or if you have a firewall blocking anonymous FTP downloads, you will be immediately notified per an error message and prompted to return to the Options menu. Try Option (2) for the manual download which does not require FTP and should avoid any protective firewall.

If FTP successfully accesses the internet, you will be prompted for a PASSWORD following this message. Enter your E-MAIL address for your password (notice that your typed password does not echo back to your screen). The AERSCREEN run will proceed when the files are downloaded and processed. NOTE: With a dial-up connection, this may take several minutes per file.

<Note: it may take several seconds for the password prompt to appear>

User (edcsgs9e.cr.usgs.gov:(none)): Password:

## AERSCREEN v1.5e - beta version

## ----- DATA ENTRY VALIDATION -----

	ENGLISH	METRIC
<b>** STACK DATA **</b>		
Emission Rate:	1.000 lb/hr	0.1260 g/s
Stack Height:	50.00 feet	15.24 meters
Stack Diameter:	24.00 inches	0.610 meters
Stack Temperature:	190.0 Deg F	360.9 K
Exit Velocity:	15.92 ft/s	4.851 m/s
Stack Flow Rate:	3000 ACFM	
Model Mode:	RURAL	
Dist to Ambient Air:	Default	
<b>** BUILDING DATA **</b>		
Building Height:	30.0 feet	9.1 meters
Building Length:	120.0 feet	36.6 meters
Building Width:	80.0 feet	24.4 meters
Building Orientation:	60.0 degrees	
Stack Direction:	90.0 degrees	
Stack Distance:	25.0 feet	7.6 meters
<b>** TERRAIN DATA **</b>		
Stack Longitude:	84.76083 deg	685000. Easting
Stack Latitude:	42.15650 deg	4669400. Northing
<b>** METEOROLOGY DATA **</b>		
Min/Max Temperature:	-10.0 / 100.0 Deg F	249.8 / 310.9 K
Minimum Wind Speed:	0.5 m/s	
Anemometer Height:	10.000 meters	
Dominant Surface Profile:	Cultivated Land	
Dominant Climate Type:	Average Moisture	

\*\*\* AERSCREEN Run is Ready to Begin - Choose Option to Proceed \*\*\*

- 1 - Change Stack Data;
- 2 - Change Building Data;
- 3 - Change Terrain Data;
- 4 - Change Meteorology Data;

- or -

Hit <Return> to Start Run

AERSCREEN v1.5e - beta version

----- PROBING FOR MAXIMUM IMPACT ZONE -----

Running MAKEMET Meteorology for Spring Profile...

Running MAKEMET Meteorology for Summer Profile...

Running MAKEMET Meteorology for Autumn Profile...

Running MAKEMET Meteorology for Winter Profile...



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-----  
REFINING IMPACTS  
-----

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
ELEVATED TERRAIN	129.967	126.588	117.448	89.553	10.486
DISTANCE FROM STACK	24. meters				
RECEPTOR HEIGHT	0.00 feet				

\*\* Input is written to "AERSCRN.INP" \*\*

\*\* Output is written to "AERSCRN.OUT" \*\*

C:\AERSCR~1\test&gt;



AERSCREEN v1.5e - beta version

----- REFINING IMPACTS -----

CALCULATION PROCEDURE	MAXIMUM 1-HOUR CONC (ug/m3)	SCALED 3-HOUR CONC (ug/m3)	SCALED 8-HOUR CONC (ug/m3)	SCALED 24-HOUR CONC (ug/m3)	SCALED ANNUAL CONC (ug/m3)
ELEVATED TERRAIN	129.967	126.588	117.448	89.553	10.486
DISTANCE FROM STACK RECEPTOR HEIGHT	24. meters 0.00 feet				
AMBIENT BOUNDARY	47.119	45.894	42.580	32.467	3.802
DISTANCE FROM STACK RECEPTOR HEIGHT	75. meters 0.00 feet				

\*\* Input is written to "AERSCRN.INP" \*\*

\*\* Output is written to "AERSCRN.OUT" \*\*

C:\AERSCR~1\test>

# AERSCREEN RESTART FILE

AERSCRN - Notepad

File Edit Format View Help

NO ECHO

```
** STACK DATA      Rate      Height      Diam.      Temp.      Velocity      Flow
**                0.1260E+00  15.2400    0.6096    360.9278   4.8510      3000.

** BUILDING DATA   Height      Length      Width      Orient.      Direct.      Offset
**                9.1440     36.5760    24.3840    60.0000     90.0000     7.6200

** MAKEMET DATA   MinT      MaxT      Speed      AnemHt      Surf Clim      Len      Bowen      Albedo
**                249.82    310.93    0.5        10.000     5           1          0.0000    0.0000    0.0000

** TERRAIN DATA   UTM East    UTM North   Zone      Nada
**                685000.0    4669400.0  16        1

** UNITS/POPULATION Units      R/U      Epip Terrain  Populat  Amb. dist.
**                e          r        y          y          0.        0.
```

CO STARTING

```
TITLEONE AERSCREEN Test Run
MODELOPT CONC SCREEN
AVERTIME 1
POLLUTID OTHER
RUNORNOT RUN
```

CO FINISHED

SO STARTING

```
LOCATION STACK POINT      0.0      0.0      304.00
SRCPARAM STACK 0.1260E+00  15.2400  360.9278   4.8510   0.6096

BUILDHGT STACK 36*9.14
BUILDWID STACK 36*42.70
BUILDLEN STACK 36*35.41
XBADJ   STACK 36*-11.87
YBADJ   STACK 36*4.90
```

SRCGROUP ALL

SO FINISHED

RE STARTING

```
DISCCART      1.0      0.0      304.00    304.00
DISCCART      2.0      0.0      304.00    304.00
DISCCART      3.0      0.0      304.00    304.00
DISCCART      4.0      0.0      304.00    304.00
DISCCART      5.0      0.0      304.00    304.00
DISCCART      6.0      0.0      304.00    304.00
DISCCART      7.0      0.0      304.00    304.00
DISCCART      8.0      0.0      304.00    304.00
DISCCART      9.0      0.0      304.00    304.00
DISCCART     10.0      0.0      304.00    304.00
DISCCART     11.0      0.0      304.00    304.00
```

# AERSCREEN DATA VALIDATION

- Warren Peters / Karen Wesson
- Jim Haywood
- Roger Brode; and
- Bob Paine;

# Results

Database	Type	No. of sources	Max. Ratio	Min. Ratio	Median Ratio
Jim Haywood	Misc.	7	3.62	1.09	2.16
Karen Wesson	Stack downwash	32	2.54	0.97	1.26
Karen Wesson	Stack non-downwash	26	2.18	0.97	1.49
Roger Brode	Varying source distances & min. wind speed	672	22.16	0.96	1.25
Bob Paine	Complex Terrain	28	7.46	1.08	2.23